

**APPLICATION OF GARY JOSEPHSON
FOR A
SUCTION ROUND KNIFE**

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CROSS REFERENCE TO RELATED APPLICATIONS

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The instant application is a nonprovisional application of provisional application number 60/454,531, filed on March 13, 2003, by Gary Josephson, for a JOSEPHSON SUCTION ROUND KNIFE, and from which priority is claimed.

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BACKGROUND OF THE INVENTION

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Field of the Invention:

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The present invention relates to a surgical round knife, more particularly, the present invention relates to a surgical round knife for connecting to a suction source.

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Description of the Prior Art:

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Presently numerous instruments are required for the successful completion of otologic (ear) surgery. One such instrument is called the round knife. This circular blade is attached to a long shaft, and allows the ear surgeon to make an incision in the ear canal and carefully dissect and lift the ear canal skin off the bony canal wall, down to the tympanic membrane (ear drum) to allow access to the middle ear space. Presently, the surgeon holds the round knife in one hand and an otologic suction in the other while working under the microscope in the ear canal.

1 Thus, there exists a need for a surgical round knife that frees the hand of the surgeon
2 holding the otologic suction to hold an additional instrument while working under the
3 microscope in the ear canal.

4 Numerous innovations for surgical instruments have been provided in the prior art.
5 Even though these innovations may be suitable for the specific individual purposes to which
6 they address, they each differ in structure and/or operation and/or purpose from the present
7 invention.

8 **FOR EXAMPLE**, U.S. Patent Number 3,913,584 to Walchle *et al.* teaches a surgical
9 instrument that constitutes a myringotomy scalpel, aspirator, and otological vent tube inserter
10 including a hand grip member having a trigger hingedly mounted thereto; an aspirator tube
11 projecting outwardly from the hand grip member and having a free, outer end which terminates
12 in a scalpel-defining tip; and a sleeve slidably carried by the aspirator tube and connected to
13 the trigger, wherein pivotal movement of the trigger imparts linear movement to the sleeve
14 along the aspirator tube.

15 **ANOTHER EXAMPLE**, U.S. Patent Number 4,445,517 to Feild teaches a surgical
16 device having aspiration and instrument control. The device is adapted for one-handed
17 simultaneous or alternate dissection and aspiration through a combination of control elements.
18 The device is particularly well-suited for neurosurgery and microsurgery.

19 **STILL ANOTHER EXAMPLE**, U.S. Patent Number to Jeffers *et al.* teaches a
20 surgical knife having a handle and a blade, the blade having a blunt tip, a generally V-shaped
21 cutting portion extending from the blunt tip to the widest part of the blade and tapered portion

1 extending from the widest part of the blade to the point of attachment of the blade with the
2 handle.

3 **YET ANOTHER EXAMPLE**, U.S. Patent Number 5,709,698 to Adams *et al.*
4 teaches a shaver blade assembly useable in either an irrigation-only mode, an aspiration-only
5 mode, or an irrigation/aspiration mode. The shaver blade assembly has a stationary elongated
6 outer tube and a movable (*e.g.* rotatable) elongated inner tube, both inner and outer tubes
7 having hubs attached to their proximal ends for attachment to a handpiece which provides
8 power to move the inner blade relative to the outer blade. The inner and outer tubes are
9 provided with cutting windows at their distal tips and the relative movement between these
10 cutting windows acts to cut tissue during surgical procedures. The outer tube is provided with
11 a fluid inlet port at the proximal end of its tubular surface and a fluid adapter is selectively
12 attachable to the outer tube so as to provide a means for introducing irrigating fluid into the
13 fluid port. The adapter is integrally formed with sealing surfaces which obviate the need for
14 O-rings and the like. A longitudinally extending irrigating channel is provided between the
15 inlet fluid port at one end of the irrigating channel and the outlet fluid port at the distal end of
16 the irrigating channel by which fluid is communicated to the vicinity of the cutting windows
17 when the shaver blade is used in the irrigation-only mode or the irrigation/aspiration mode.
18 The channel may be either the annular clearance space itself or a separate, dedicated groove
19 or channel formed in the mating surfaces of the tubular members. Removing the adapter and
20 the fluid supply enables the shaver to continue being used in an aspiration-only mode.

21 **STILL YET ANOTHER EXAMPLE**, U.S. Patent Number 6,679,897 to Josephson
22 teaches an adenoid curette that includes a shank, a handle, and a cutting head. The shank has
23 a pin, male threads, and a collar. The cutting head is a loop that is continuous and has a

1 groove, a slot, and a neck. The shank is placed in the groove and in the neck, and the pin is
2 positioned in the slot. The collar is threaded onto the male threads, captures the neck during
3 threading, and abuts against the cutting head during threading so as to force the pin further into
4 the slot until the collar can no longer rotate indicating that the pin is fully seated in the slot and
5 thereby causing the cutting head to be captured between the pin and the collar and thereby
6 interchangeably retaining the cutting head on the shank.

7 It is apparent that numerous innovations for surgical instruments have been provided
8 in the prior art that are adapted to be used. Furthermore, even though these innovations may
9 be suitable for the specific individual purposes to which they address, they would not be
10 suitable for the purposes of the present invention as heretofore described.

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SUMMARY OF THE INVENTION

ACCORDINGLY, AN OBJECT of the present invention is to provide a surgical round knife for connecting to a suction source that avoids the disadvantages of the prior art.

ANOTHER OBJECT of the present invention is to provide a surgical round knife for connecting to a suction source that is simple to use.

BRIEFLY STATED, STILL ANOTHER OBJECT of the present invention is to provide a surgical round knife for connecting to a suction source. The knife includes a shaft that is hollow, a round blade on one end of the shaft, and a suction interface on the other end of the shaft. The suction interface fluidly communicates with the suction source so as to provide a suction at the round blade and thereby free up a hand of a surgeon from having to hold a separate suction device and thereby allow the hand of the surgeon to hold an additional instrument. The suction interface includes a bulbous ferrule that is sealingly engaged in a plastic suction tube that fluidly communicates with the suction source so as to allow the suction to extend through the shaft. The shaft extends into the round blade approximately one third to one half the round blade so as to provide the suction at the round blade.

The novel features which are considered characteristic of the present invention are set forth in the appended claims. The invention itself, however, both as to its construction and its method of operation, together with additional objects and advantages thereof, will be best understood from the following description of the specific embodiments when read and understood in connection with the accompanying drawing.

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BRIEF DESCRIPTION OF THE DRAWING

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The figures of the drawing are briefly described as follows:

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FIGURE 1 is a diagrammatic top plan view of the surgical round knife for connecting to

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a suction source of the present invention; and

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FIGURE 2 is a diagrammatic side elevational view taken generally in the direction of

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ARROW 2 in **FIGURE 1**.

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FIGURES 3A, 3B, 3C, 3D, 3E, 3F, 3G and 3H depict an otologic surgical procedure in

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which the present invention is useful.

1 **LIST OF REFERENCE NUMERALS UTILIZED IN THE DRAWING**

2	10	surgical round knife of present invention for connecting to suction source 12
3	12	suction source
4	14	shaft
5	16	round blade
6	18	suction interface for fluidly communicating with suction source 12 so as to provide
7		suction at round blade 16 and thereby free up hand (<i>not shown</i>) of surgeon (<i>not shown</i>)
8		from having to hold separate suction device (<i>not shown</i>) and allow hand (<i>not shown</i>)
9		of surgeon (<i>not shown</i>) to hold additional instrument (<i>not shown</i>)
10	20	proximal end of shaft 14
11	22	distal end of shaft 14
12	24	bulbous ferrule of suction interface 18 for being sealing engaged in plastic suction tube
13		26 that fluidly communicates with suction source 12 so as to allow suction to extend
14		through shaft 14
15	26	plastic suction tube

1 **DETAILED DESCRIPTION OF THE INVENTION**

2 Referring now to the **FIGURES 1 and 2**, which are, respectively, a diagrammatic top
3 plan view of the surgical round knife for connecting to a suction source of the present
4 invention, and, a diagrammatic side elevational view taken generally in the direction of
5 **ARROW 2** in **FIGURE 1**, and in which like numerals indicate like parts, the surgical round
6 knife of the present invention is shown generally at **10** for connecting to a suction source **12**.

7 The surgical round knife **10** comprises a shaft **14**, a round blade **16**, and a suction
8 interface **18**. The round blade **16** is disposed on one end of the shaft **14**. The suction interface
9 **18** is disposed on the other end of the shaft **14** and is for fluidly communicating with the
10 suction source **12** so as to provide a suction at the round blade **16** and thereby free up a hand
11 *(not shown)* of a surgeon *(not shown)* from having to hold a separate suction device *(not*
12 *shown)* and thereby allow the hand *(not shown)* of the surgeon *(not shown)* to hold an
13 additional instrument *(not shown)*.

14 The shaft **14** is slender, elongated, and hollow, and has a proximal end **20** and a distal
15 end **22**.

16 The suction interface **18** is disposed on the proximal end **20** of the shaft **14** and the
17 round blade **16** is disposed on the distal end **22** of the shaft **14**.

18 The suction interface **18** comprises a bulbous ferrule **24**. The bulbous ferrule **24** of the
19 suction interface **18** is disposed around the proximal end **20** of the shaft **14** and is for being

1 sealing engaged in a plastic suction tube 26 that fluidly communicates with the suction source
2 12 so as to allow the suction to extend through the shaft 14.

3 The bulbous ferrule 24 of the suction interface 18 can be separate from, or be one-piece
4 with, the proximal end 20 of the shaft 14 so long as the bulbous ferrule 24 and the proximal
5 end 20 of the shaft 14 form an integral structure.

6 The distal end 22 of the shaft 14 extends into the round blade 16 so as to allow the
7 suction to extend through the shaft 14 to the round blade, and terminates approximately one
8 third to one half along the round blade 16.

9 It will be understood that each of the elements described above, or two or more
10 together, may also find a useful application in other types of constructions differing from the
11 types described above.

12 **EXAMPLE OF TYPICAL OTOLOGIC SURGICAL PROCEDURE**

13 **IN WHICH THE PRESENT INVENTION IS USEFUL**

14 Otolgic surgery requires the skilled surgeon to have a keen sense of vision while
15 working through a microscope, a strong knowledge of the anatomy of the ear and temporal
16 bone, a delicate touch while working around vital structures, and the correct tools to achieve
17 the best results for the patient. As we enter the twenty first century, newer instrumentation is
18 allowing the surgeon to achieve these excellent results in improving hearing, while removing
19 and curing ear disease.

1 There are two ways that the otologic surgeon gains entrance into the middle and inner
2 ear. One is the trans-canal approach (through the ear canal), and the other is post-auricular
3 (behind the ear). Either of these routes is essential for the surgeon to gain exposure to do his
4 or her work. The transcanal route is more limited, however, either of these techniques require
5 similar instrumentation. The procedures included below are examples of the types of otologic
6 surgery in which the suction round knife is needed.

7 As in any surgery, one limitation the surgeon experiences is the use of only his or her
8 two hands. In some types of surgery, the surgeon has the fortune of an assistant to help during
9 his or her work allowing additional hands to hold instrumentation. In microscopic otologic
10 surgery, the surgeon does not have the ability to have an assistant because of the small working
11 area. Therefore, the otologist must rely on instrumentation available and only his or her two
12 hands.

13 In the practice of ear surgery, during most of a procedure, the surgeon finds him or
14 herself using one hand to hold a suction to evacuate blood while the other hand cuts, elevates
15 flaps, and removes or repairs disease, tissue or bone. Hence, the benefit of the new instrument
16 the suction round knife described in this patent application.

17 Surgeries that can utilize the new suction round knife:

- 18 1) Tympanoplasty (repair of eardrum)
- 19 2) Ossiculoplasty (repair of ear bones)
- 20 3) Mastoidectomy (remove disease (tumor or infection) from mastoid)
- 21 4) Cochlear implantation (implant device to provide hearing in deaf patients)
- 22 5) Congenital ear surgery (create an ear canal)

- 1 6) Inner ear surgeries for dizziness, facial nerve disorders
- 2 7) Other similar procedures

3 **SURGICAL TECHNIQUE**

4 The technique is described from the point of elevating the skin from the external
5 auditory canal, as the post-auricular and transcanal approach both reach this point at some time
6 during the surgical procedure. The entire procedure is performed looking through a
7 microscope.

8 After injection with topical anesthesia into the ear canal (Figure 3A) and behind the
9 surgeon will now be ready to make the incision and elevate a tympanomeatal flap (ear canal
10 skin and drum). This will allow for exposure to the middle and inner ear structures. The
11 surgeon will use a knife to make two vertical canal incisions. One at 12 O'clock and another
12 at 6 O'clock extending from the ear drum out of the canal about one centimeter. A third
13 incision will now be made in an horizontal fashion along the posterior canal wall connecting
14 the first two vertical incisions (Figure 3B). The surgeon uses one hand to hold a suction, and
15 the other hand to hold a tissue elevator (Figure 3C). In a sequential fashion, the surgeon
16 elevates the tissue off of the bony canal wall while holding the suction tip close to the elevator
17 to evacuate the blood and maintaining visualization. Occasionally, the surgeon will stop to
18 grab another instrument such as a scissor and cut adherent tissue while continuing to elevate
19 or suction depending on how well hemostasis (bleeding) is controlled. Once the skin is
20 elevated off the posterior canal wall down to the ear drum edge, the surgeon delicately elevates
21 the eardrum edge out of its sulcus (Figure 3D). This allows entrance into the middle ear space.
22 The surgeon proceeds depending on the nature of the problem.

1 This demonstrates the use of standard instrumentation for the elevation of the
2 tympanometal flap common in most otologic surgery. With the suction round knife, the
3 surgeon has the ability to free one hand so that elevation and suctioning of blood can be
4 performed with a single instrument and hand, allowing the surgeon to use the other hand for
5 additional instrumentation and work. This allows for a safer, more rapid, and precise elevation
6 of the canal skin in otologic surgery.

7 **OTHER USES FOR THE SUCTION ROUND KNIFE**

8 Multiple procedures are mentioned above, however for additional detail, during the
9 entire procedure after the flap is elevated, healthy and diseased tissue is teased off of otologic
10 structures such as the ear bones, floor of the middle ear, mastoid bone, semicircular canals,
11 cochlea, facial nerve, and other structures (Figures 3E, 3F 3G and 3H). During these surgical
12 techniques, the surgeon is using a suction, an elevator, and knife by rotating the instruments
13 amongst two hands. Again, this new, useful and non-obvious instrument allows the surgeon
14 to have three instruments in a single hand. The suction round knife has a cutting edge, a round
15 surface for elevation and a suction all in one. This allows the surgeons free hand to use other
16 instrumentation to improve the surgeons ability to perform these operations.

17 Figures 3A - 3H are from:

18 Surgical Pediatric Otolaryngology Editors: Potsic, WP, Cotton RT, Handler SD. Thieme
19 Publishers 1997

1 Although the invention has been illustrated and described as embodied in a surgical
2 round knife for connecting to a suction source, however, it is not limited to the details shown,
3 since it will be understood that various omissions, modifications, substitutions and changes
4 in the forms and details of the device illustrated and its operation can be made by those skilled
5 in the art without departing in any way from the spirit of the present invention.

6 Without further analysis, the foregoing will so fully reveal the gist of the present
7 invention that others can, by applying current knowledge, readily adapt it for various
8 applications without omitting features that, from the standpoint of prior art, fairly constitute
9 characteristics of the generic or specific aspects of this invention.